Notice of Allowability	Application No.	Applicant(s)	
	10/575,740	ZOECKLER ET AL.	
	Examiner	Art Unit	
	Ling-Siu Choi	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the Amendment filed 10/12/2007*.

2. ☒ The allowed claim(s) is/are *1-22*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed 10/12/2007. Claims 17-22 have been added. Claims 1-22 are now pending.

Examiner's Amendment

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Kevin J. Nilsen on October 30, 2007.

3. The application has been amended as follows:

Claim 3, line 1, change "composition of Claim-1" to --composition of Claim 1--;

Claim 22, line 1, change "The process of Claim 19" to --The process of Claim 21--;

Amend claims 1, 4, and 21 as follows,

--**1**. (currently amended): A Ziegler-Natta catalyst precursor composition comprising the spray-dried reaction product of a magnesium compound, a non-metallocene titanium compound, and at least one non-metallocene compound of a transition metal

other than titanium, said at least one non-metallocene compound of a transition metal other than titanium comprising a hafnium compound and the molar ratio of the titanium compound to hafnium compound being from 100/1 to 1/1.2.--

-- **4**. (currently amended): A process for preparing a Ziegler-Natta precursor composition comprising forming a liquid composition of a magnesium compound, a non-metallocene titanium compound, and at least one non-metallocene compound of a transition metal other than titanium in a primary diluent and spray drying the liquid composition to form solid particles of the precursor composition, wherein said primary diluent is an organic compound containing hydroxyl functionality and said at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound; and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/20. –

--**21**. (currently amended): A process for conversion of a catalyst precursor composition into a

procatalyst composition for use in Ziegler-Natta polymerization processes comprising halogenating a precursor composition comprised of a Ziegler-Natta catalyst precursor composition comprising the spray-dried reaction product of a magnesium compound, a non-metallocene titanium compound, and at least one non-metallocene compound of a transition metal other than titanium, said at least one non-metallocene compound of a transition metal other than titanium comprising a hafnium compound and the ratio of the titanium compound to hafnium compound being from 100/1 to 1/1.2.—;

Allowable Subject Matter

4. Claims 1-22 are allowed.

5. The following is an examiner's statement of reasons for allowance:

The present claims are allowable over the closest references: Wagner et al. (US 6,982,237 B2), Jorgensen et al. (US 5,290,745), Masi et al. (EP 0 449 355 A2), and Hwu et al. (EP 0 783 007 A2).

Summary of claim 1:

A Ziegler-Natta catalyst precursor composition comprising the spray-dried reaction product of	
	a **magnesium** compound
	a non-metallocene **titanium** compound
	at least one non-metallocene compound of **a transition metal other than titanium**
the at least one non-metallocene compound of a transition metal other than titanium comprising a hafnium compound and the molar ratio of the titanium compound to hafnium compound being from 100/1 to 1/1.2	

Summary of claim 4:

A process for preparing a Ziegler-Natta precursor composition comprising	
A	forming a liquid composition of a **magnesium** compound, a non-metallocene **titanium** compound, **and** at least one non-metallocene compound of **a transition metal other than titanium** in a primary diluent
B	spray drying the liquid composition to form solid particles of the precursor composition
the at least one non-metallocene compound of a transition metal other than titanium comprising a hafnium compound; the molar ratio of the titanium compound to hafnium compound being from 100/1 to 1/20; and the primary diluent being an organic compound containing hydroxyl functionality	

Summary of Claim 21:

A process for conversion of a catalyst precursor composition into a procatalyst composition for use in Ziegler-Natta polymerization processes comprising	
	halogenating a precursor composition comprised of a Ziegler-Natta catalyst precursor composition comprising the spray-dried reaction product of - a magnesium compound, - a non-metallocene titanium compound, and - at least one non-metallocene compound of a transition metal other than titanium
the at least one non-metallocene compound of a transition metal other than titanium comprising a hafnium compound and the ratio of the titanium compound to hafnium compound being from 100/1 to 1/1.2	

Wagner et al. disclose a spray-dried catalyst precursor obtained by (A) providing a mixture or reaction product of magnesium halide, a solvent, an electron donor, and a transition metal compound which is selected from Groups 3-10 and lanthanides; (B)

contacting the mixture or reaction product with an inert filler to form a slurry; and (C) spray-drying the slurry, wherein the inert filler can be silicon dioxide, titanium dioxide, zinc oxide, magnesium carbonate, magnesium oxide, carbon, or calcium carbonate and has a median particle size of about 10 μm to about 60 μm; and the transition metal compound **can be** a combination of a titanium compound and a hafnium compound (col. 11, lines 41-52; claims 1, 7-8, and 15). Wagner et al. further disclose that the spray-dried catalyst precursor further comprises a Lewis acid such as triethyl aluminum or organoboron halide (claims 21-24). However, Wagner et al. do not teach or fairly suggest the claimed Ziegler-Natta catalyst precursor composition, wherein the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/1.2 or claimed process to prepare the Ziegler-Natta precursor composition, wherein the primary diluent is an organic compound containing hydroxyl functionality; the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound; and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/20.

Jorgensen et al. disclose a catalyst system comprising (A) an organoaluminum compound which can be $Al(C_2H_5)_2Cl$ or $Al_2(C_2H_5)_3Cl_3$ and (B) a titanium trichloride component prepared by (i) reducing titanium tetrachloride with magnesium metal in an electron donor solvent; (ii) adding additional magnesium dichloride to the resulting solution; and (iii) spray-drying the solution with a filler to obtain discrete particles of catalyst (col. 6, lines 36-40; claim 1). However, Jorgensen et al. do not teach or fairly

suggest the claimed Ziegler-Natta catalyst precursor composition, wherein the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/1.2 or claimed process to prepare the Ziegler-Natta precursor composition, wherein the primary diluent is an organic compound containing hydroxyl functionality; the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound; and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/20.

Masi et al. disclose a supported catalyst for olefin polymerization in the presence of a catalyst comprising (a) an organomettalic compound of aluminum and (B) a second component obtained by bring a magnesium compound, a titanium compound, and a hafnium compound with a porous support, wherein the molar ratio of Mg/Ti/Hf is 2/1/0.8 (abstract; page 4, lines 18-22; Example 4). However, Masi et al. do not teach or fairly suggest the claimed Ziegler-Natta catalyst precursor composition, wherein the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/1.2 or claimed process to prepare the Ziegler-Natta precursor composition, wherein the primary diluent is an organic compound containing hydroxyl functionality; the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound; and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/20.

Hwu et al. disclose a catalyst precursor for olefin polymerization, obtained by spray - drying a mixture of a titanium compound, a magnesium compound, a support, and an electron donor (page 3, lines 10-16 and 34-58; page 4, lines 1-5). Hwu et al. further disclose a catalyst comprising a catalyst precursor and a cocatalyst which is triethylaluminum (page 4, lines 6-13). However, Hwu et al. do not teach or fairly suggest the claimed Ziegler-Natta catalyst precursor composition, wherein the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/1.2 or claimed process to prepare the Ziegler-Natta precursor composition, wherein the primary diluent is an organic compound containing hydroxyl functionality; the at least one non-metallocene compound of a transition metal other than titanium comprises a hafnium compound; and the molar ratio of the titanium compound to hafnium compound is from 100/1 to 1/20.

In light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reach on 571-272-1114.

L. C. Choi

LING-SUI CHOI
PRIMARY EXAMINER

November 10, 2007